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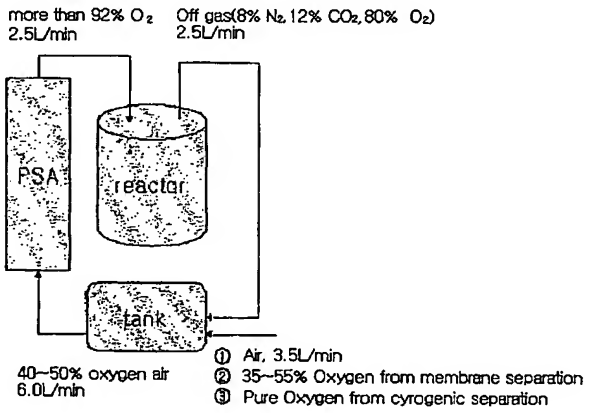
(54) Title: METHOD FOR PRODUCING A USEFUL COMPOUND AND TREATING A WASTEWATER USING PURE OXYGEN



(57) Abstract: The present relates to a method of using pure oxygen in microbial fermentation processes and wastewater treatment processes, in which the pure oxygen is produced by a pressure swing adsorption (PSA) process from a gas mixture of air and unused oxygen-containing recycled off-gas from microbial processes which uses oxygen-containing gas in a liquid or gas state. According to the present invention, when pure oxygen with a purity of more than 90% is used in microbial processes, microbial productivity can be about 5 times as increased as it is that in the conventional method using air with an oxygen content of 21%, and the volume of an active sludge tank in wastewater treatment processes can be reduced to at most 1/5 of the volume as compared to the conventional method. Also, the off-gas from such pure oxygen processes has a high oxygen content of about 70-80%. Thus, when the off-gas is recycled with air for the supplement of oxygen consumption, the gas mixture with an oxygen content of about 40% is used as feed gas for the PSA process, and CO_2 generated by microbial breathing is also removed. Thus, in the present invention, the volume of a PSA column and an air compressor for supplying the feed gas can be reduced to less than $\frac{1}{2}$ of the volume as compared to that of the use of air.

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